

**AMENDMENTS TO THE CLAIMS**

1. (Cancelled)
2. (Previously Presented) A biochip cartridge according to claim 6, 24 or 26 wherein said capture binding ligands comprise nucleic acids.
3. (Previously Presented) A biochip cartridge according to claim 6, 24 or 26 wherein said reaction chamber further comprises a gasket to retain fluid in contact with said array.
4. (Cancelled)
5. (Previously Presented) A biochip cartridge according to claim 6, 24, or 26 wherein said reaction chamber further comprises an outlet port.
6. (Previously Presented) A biochip cartridge comprising:
  - a) a reaction chamber comprising:
    - i) a substrate comprising an array of electrodes, each comprising:
      - A) a self-assembled monolayer; and
      - B) a capture binding ligand;
    - ii) an inlet port positioned at the bottom of the reaction chamber for the introduction of reagents;
    - iii) an outlet port positioned at the top of the reaction chamber to minimize the introduction or retention of air bubbles upon introduction of reagents and
  - b) interconnects to allow the electrical connection of said electrodes to a processor.
7. (Previously Presented) A biochip cartridge according to claim 6, 24, or 26 wherein said array is on one surface of said substrate.
8. (Previously Presented) A biochip cartridge according to claim 6, 24, or 26 wherein two surfaces of said substrate each comprise an array.
9. (Previously Presented) A biochip cartridge according to claim 6, 24, or 26 further comprising a cap comprising at least one storage well comprising assay reagents.

Claims 10-23. Cancelled.

24. (Previously Presented) A biochip cartridge comprising:  
a) a reaction chamber comprising:  
i) a substrate comprising a printed circuit board comprising an array of electrodes, each electrode comprising:

A) a self-assembled monolayer; and

B) a capture binding ligand;

ii) an inlet port for the introduction of reagents; and

b) interconnects to allow the electrical connection of said electrodes to a processor.

25. (Currently Amended) A biochip cartridge according to claim 6 or 24, wherein said inlet ~~outlet~~ port comprises a valve comprising a semipermeable membrane filter.

26. (Currently Amended) A biochip cartridge comprising:  
a) a reaction chamber comprising:  
i) a substrate comprising an array of electrodes, each electrode comprising:  
A) a self-assembled monolayer; and  
B) a capture binding ligand;  
ii) an inlet port for the introduction of reagents, said inlet ~~outlet~~ port comprising a valve including a semipermeable membrane filter; and  
b) interconnects to allow the electrical connection of said electrodes to a processor.

27. (Previously Presented) A biochip cartridge according to claim 26, wherein said semipermeable membrane preferentially allows the escape of gas and retains sample fluid.

28. (Previously Presented) A biochip cartridge according to claim 26, wherein said semipermeable membrane comprises polytetrafluoroethylene.

29. (Previously Presented) A biochip cartridge according to claim 26, wherein said semipermeable membrane comprises expanded-polytetrafluoroethylene.

30. (Previously Presented) A biochip cartridge according to claim 6 or 26 wherein said substrate comprises a printed circuit board.

31. (Previously Presented) A biochip cartridge according to claim 6, 24, or 26, wherein said capture binding ligands comprise proteins.

32. (Previously Presented) A cartridge according to claim 6, wherein the inlet port and the outlet port are separated.

33. (Previously Presented) A cartridge according to claim 6, wherein the inlet port connects to the outlet port.

34. (Previously Presented) A cartridge according to claim 9, wherein the cap is removable.

35. (Withdrawn) A method for filling a reaction chamber comprising:  
providing a cartridge comprising a reaction chamber, an inlet port positioned at the bottom of the reaction chamber, and an outlet port positioned at the top of the reaction chamber;  
introducing a fluid into the inlet port positioned at the bottom of the reaction chamber;  
allowing escape of gas through the outlet port at the top of the reaction chamber, thereby filling the reaction chamber without introducing a bubble into the reaction chamber.

36. (New) A biochip cartridge according to claim 24, wherein at least one of the electrodes is on a surface of the printed circuit board.

37. (New) A biochip cartridge according to claim 24, wherein at least one of the electrodes is fabricated on the printed circuit board.

38. (New) A biochip cartridge according to claim 6, 24, or 26, wherein an assay complex is formed on at least one of said electrodes, the assay complex comprising at least one of said capture binding ligands, a target analyte, and an electron transfer moiety.

39. (New) A biochip cartridge according to claim 6, 24, or 26, wherein the self-assembled monolayer comprises a conductive oligomer.

40. (New) A biochip cartridge according to claim 6, 24, or 26, wherein at least one of the electrodes comprises gold.

41. (New) A biochip cartridge according to claim 6, 24, or 26, wherein the self-assembled monolayer comprises a thiol-containing monolayer forming species.